PATENT SPECIFICATION 723,457

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COMPLETE SPECIFICATION.

Joint for an Electric Cable.

We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of Connaught House, 63 Aldwych, London, W.C.2, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to joints in electric cables.

Owing to the increasing shortage of lead electric cables are now being made with a thin lead sheath surrounded by a further sheath of polythene or similar thermoplastic material. The lead sheath is of course completely water proof apart from actual damage or manufacturing defects. The lead sheath being a conductor has an electrical screening effect while the thermoplastic sheath surrounding it is also water proof and adds to the mechanical strength. In such a cable the lead sheath is not connected to ground and in order to keep the condition of the thermoplastic sheath under observation tests are made of the insulation resistance between the lead sheath and ground. This leads to a difficulty when joints are to be made. The thin lead sheaths of the two cables can be joined together by the use of a lead sleeve in the well known manner but unfortunately the outer thermoplastic sheaths cannot so readily be connected by means of a sleeve of the same thermoplastic material as the coefficient of expansion of such materials is very much greater than that of lead. If the thermoplastic sleeve is jointed to the two thermoplastic sheaths by the application of heat in the normal manner it has been found that the sleeve or the sheath in the neighbourhood of the joint tends to crack as the sheaths contract when they are cooling down. It is the object of the present invention to provide a method of making joints in such cables which is free from this defect and which at the same time preserves the high insulation resistance between the thin lead sheath and ground.

It is evident that it is necessary to use a sleeve of high insulating properties but one which is more elastic than the thermoplastic material forming the outer sheath of the cable. Suitable materials would be rubber or a synthetic rubber such as neoprene which has better electrical properties than natural rubber and which does not gradually deteriorate. Other organic elastic materials may be used but none of the known suitable ones can readily be bonded to the thermoplastic cable sheath. This difficulty is overcome by binding the ends of the sleeve down onto the sheaths by means of a tight lapping of wire or preferably by means of adjustable metal hose clamps such as are commonly used, for example, to bind flexible rubber and canvas connecting pipes to the radiator and cylinder block in motor vehicles.

As however it is inevitable that the overall diameter of the lead sleeve will be greater than that of the lead cable sheath elastic annular bushes are provided to fill up the gaps between the ends of the elastic sleeve, as will be shown, and the thermoplastic sheaths ; the metal hose clamps being so placed that they squeeze the ends of the sleeve down onto the annular bushes which are therefore themselves squeezed down onto the cable sheaths, thereby making a water tight seal.

The invention therefore provides a joint connecting two lengths of electric cable sheathed with thin lead sheaths surrounded by sheaths of thermoplastic material, comprising a lead sleeve surrounding the jointed and insulated cable conductors and plumbed to the thin lead sheaths and further surrounded by a sleeve of an organic material which is elastic, the nds of which sleeve surround the ends of the cable sheaths and are bound down around the thermo-

plastic cable sheaths to form a water tight seal.

An embodiment of the present invention will now be described with reference to the single figure of the drawing accompanying the Provisional Specification in which there are shown two cable ends 1 and 2 each provided with a polythene sheath 3 surrounding a thin lead sheath 4 which surrounds the insulated cable core. After the cable conductors of the two cable ends 1 and 2 have been connected together and insulated a lead sleeve 5 is passed over the jointed conductors and is plumbed to the ends of the thin lead sheaths 4 in the known manner as shown at 6. Annular bushes 7 of an elastic organic material such as neoprene are placed on the ends of the polythene sheath (only one is shown). An outer sleeve 8 which is also made of an elastic organic material is then passed along over the two annular bushes 7 into the position shown. Finally two adjustable metal clamps 9 are placed around the ends of the sleeve 8 over the annular bushes 7 and are tightened up so as to clamp the ends of the sleeve firmly onto the bushes and the bushes firmly onto the outside of the cable sheaths.

Adjustable clamps of the kind required for this invention are well known and a very simple one is shown in the figure.

A threaded screw 10 is firmly attached to one end of the metal clip 9 and the other end of the clip carries a metal shoulder 11 while a knurled nut 12 engages the threaded screw 10. When this nut 12 is tightened up it draws the two ends of the clamp together and compresses the end of the sleeve 8 onto the bush 7 and so forms a seal so that moisture cannot gain access to the space between the lead sleeve 5 and the neoprene outer sheath 8.

In the embodiment just described polythene is referred to as the material of the outer sheath of the cable but it is to be understood that other thermoplastic materials may be preferred in some cases. Similarly neoprene is referred to as a suitable elastic organic material for the insulating sleeve but there are other suitable organic materials which may in some cases be preferred.

What we claim is :—

1. Joint connecting two lengths of electric cable sheathed with thin lead sheaths surrounded by sheaths of a thermoplastic material, comprising a lead sleeve surrounding the jointed and insulated cable conductors and plumbed to the thin lead sheaths and further surrounded by a sleeve of an organic material which is elastic, the ends of which sleeve surround the ends of the cable sheaths and are bound down around the thermoplastic cable sheaths to form a water tight seal.

2. Joint as claimed in Claim 1, in which the thermoplastic sheathing material is polythene.

3. Joint as claimed in Claim 1 or Claim 2, in which said organic elastic material is real or synthetic rubber.

4. Joint as claimed in any of the foregoing claims, in which annular bushes of elastic organic insulating material are placed over the ends of the thermoplastic sheaths of the cable lengths the sleeve of organic elastic material being bound over the bushes to form the water tight seal.

5. Joints as claimed in any of the foregoing claims in which the ends of the sleeve of elastic material are bound down by means of a lapping of wire.

6. Joint as claimed in any of the Claims 1 to 4, in which the ends of the sleeve of elastic material are bound down by means of adjustable metal clamps.

7. Joint connecting two lengths of cable substantially as described and illustrated in the drawing accompanying the Provisional Specification.

ERNEST E. TOWLER,
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PROVISIONAL SPECIFICATION.

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the well known manner but unfortunately the outer thermoplastic sheaths cannot so readily be connected by means of a sleeve of the same thermoplastic material as the coefficient of expansion of such materials is very much greater than that of lead. If the thermoplastic sleeve is jointed to the two thermoplastic sleeves by the application of heat in the normal manner it has been found that the sleeve or the sheath in the neighbourhood of the joint tends to crack as the sleeves contract when they are cooling down. It is the object of the present invention to provide a method of making joints in such cables which is free from this defect and which at the same time preserves the high insulation resistance between the thin lead sheath and ground.

It is evident that it is necessary to use a sleeve of high insulating properties but one which is more elastic than the thermoplastic material joining the outer sheath of the cable. Suitable materials would be rubber or a synthetic rubber such as neoprene which has better electrical properties than natural rubber and which does not gradually deteriorate. Other elastic materials may be used but none of the known suitable ones are thermoplastic and therefore cannot readily be bonded to the cable sheath. This difficulty is overcome by binding the ends of the sleeves down onto the sheaths by means of adjustable metal hose clips such as are commonly used, for example, to bind flexible rubber and canvas connecting pipes to the radiator and cylinder block in motor vehicles.

As however it is inevitable that the overall diameter of the lead sleeve will be greater than that of the lead cable sheath elastic annular bushes are provided to fill up the gaps between the ends of the elastic sleeves, as will be shown, and the lead sheaths; the metal hose clips being so placed that they squeeze the ends of the sleeve down onto the annular bushes which are therefore themselves squeezed down onto the cable sheaths, thereby making a water tight seal.

The invention therefore provides a joint connecting two lengths of electric cable sheathed with thin lead sheaths surrounded by thermoplastic sheaths, comprising a lead sleeve surrounding the jointed and insulated cable conductors and plumbed to the thin lead sheaths and further surrounded by a sleeve of an organic material which is elastic but not thermoplastic, the ends of which sleeve surround the ends of the cable sheaths and are bound down around the thermoplastic cable sheaths to form a water tight seal by means of adjustable metal clamps.

An embodiment of the present invention will now be described with reference to the single figure of the accompanying drawing in which there are shown two cable ends 1 and 2 each provided with a polythene sheath 3 surrounding a thin lead sheath 4 which surrounds the insulated cable core. After the cable conductors of the two cable ends 1 and 2 have been connected together and insulated a lead sleeve 5 is passed over the jointed conductors and is plumbed to the ends of the thin lead sleeve 4 in the known manner as shown at 6. Annular bushes 7 of an elastic material such as neoprene are placed on the ends of the polythene sheath (only one is shown). An outer sleeve 8 which is also made of an elastic organic material is then passed along over the two annular bushes 7 into the position 8 shown. Finally two adjustable metal clips 9 are placed around the ends of the sleeve 8 over the annular bushes 7 and are tightened up so as to clamp the ends of the sleeve firmly onto the bushes and the bushes firmly onto the outside of the cable sheaths.

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723,457 PROVISIONAL SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.